

- (54) Fastening device for furniture joints**

(57) Two panels (1, 2) each have a respective fastening component (5, 6) secured in a recess therein. The components (5, 6) are each provided with upper and lower projecting surfaces (11a, 11b, 12a, 12b) which

are aligned in planar abutting relationship and over which cap elements (13, 18) are secured thereby to interconnect the components (5, 6) and hence the panels (1, 2). The device is of value in assembling furniture. The components (5, 6) and recesses are each semi-circular in plan.

Technical drawing of a mechanical assembly in cross-section. The assembly consists of two main components, 1 and 2, joined by a central bolt 13. The drawing shows various internal features and fasteners labeled with numbers 1 through 21. The drawing is a black and white line drawing with hatching for cross-sections.

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FIG. 1.

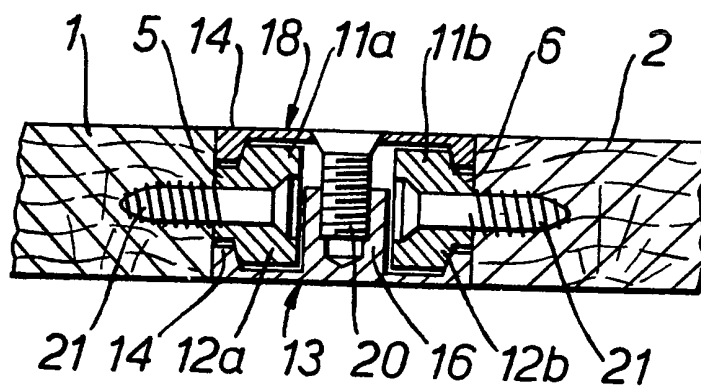


FIG. 2.

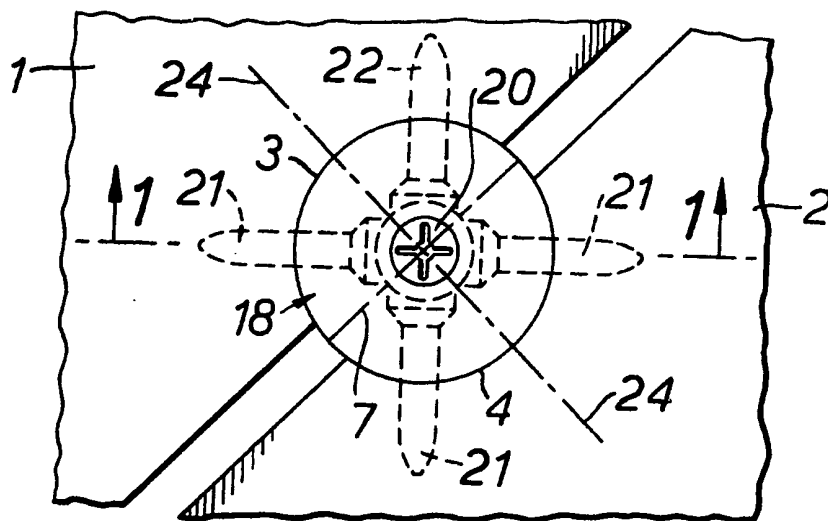
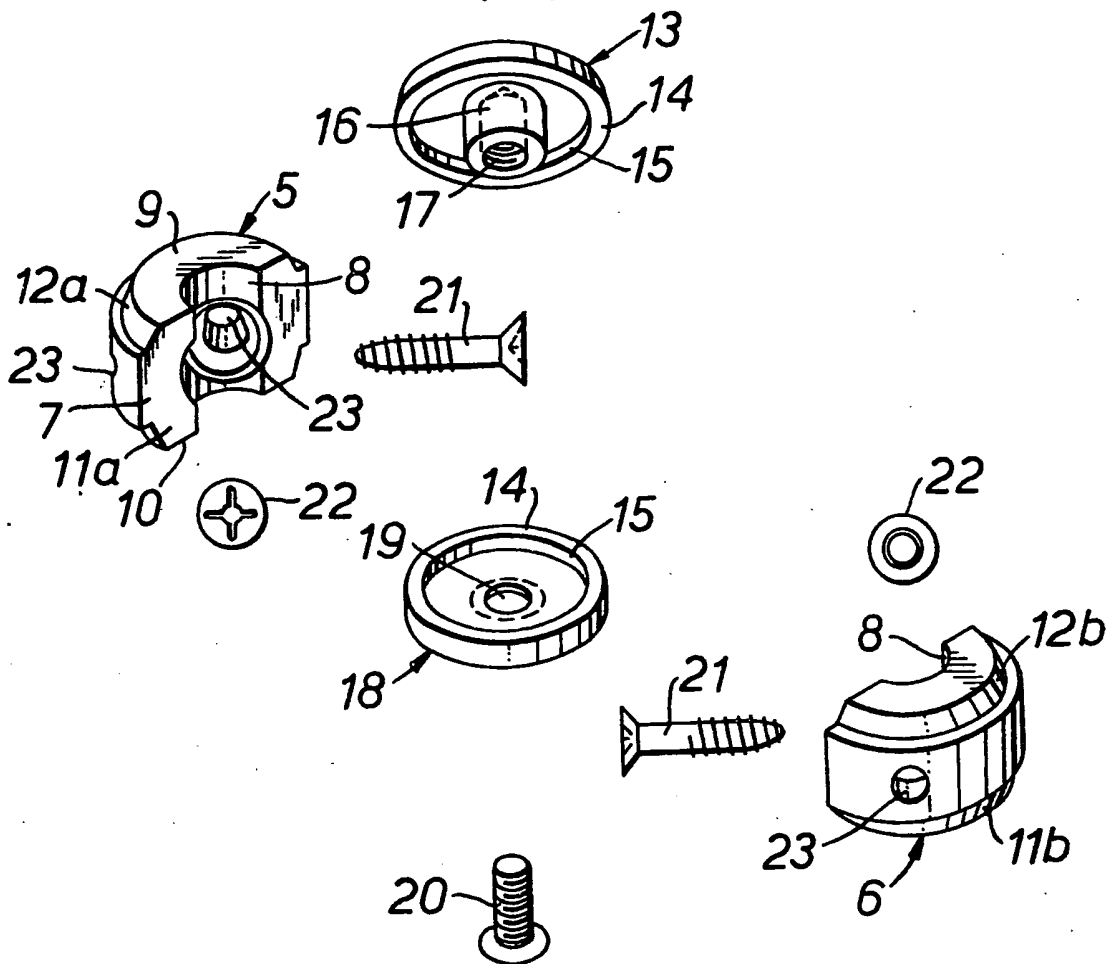


FIG. 3.



SPECIFICATION **Fastening device**

This invention relates to a device for detachably connecting at least two members.

5 When it is necessary to interconnect two members so as to allow relatively easy disengagement thereof, problems are often encountered regarding the mounting of suitable connecting elements, particularly if the members have a certain volume and are to be interconnected in abutting relationship along a larger common plane. Screws or bolts are not always suitable because they have to be mounted at an oblique angle relative to the contacting surface in order not to be too long and also because they are visible in such an oblique mounting position which is likewise not necessarily desirable. Particularly where furniture is concerned, care is always taken, wherever possible, to avoid fastening elements that are visible from the outside. This is often achieved at the expense of detachability which complicates replacement of, for example, damaged components of the member, particularly of a piece of furniture.

According to the present invention there is provided a device for detachably connecting at least two members, comprising:

(a) at least two components each having top and bottom faces and a peripheral outside edge connectible in abutting relation with a respective one of the members; the components having a projection on at least one of the top and bottom faces thereof;

(b) cap means adapted to overlie and receive the projections thereby to interconnect the components; and

(c) means to secure the cap means on the components.

Such a device may be used for inconspicuously connecting members, particularly at locations on the members where it has heretofore been very difficult, if not impossible, to provide such a connection. The device may be constructed in simple and robust fashion, allowing its manufacture by mass production techniques. The device may be designed in such a manner that only a simple tool e.g. a screwdriver is needed to connect or separate the members.

The invention is illustrated by way of example in the accompanying drawings, wherein:

Figure 1 is a sectional view of a device constituting one embodiment of the present invention interconnecting two members;

Figure 2 is a plan view of the device of Figure 1; and

Figure 3 is an exploded perspective view of the individual elements of the device.

The embodiments illustrated in the drawings is concerned with the interconnection of two members. However, the invention is not limited thereto as will be discussed hereinafter.

Referring to Figures 1 and 2, two members 1, 2 illustrated in the form of two plates, are to be

connected together side by side. For this purpose, a recess 3, 4 is provided in each member. The recesses, in the embodiment illustrated, are semi-circular and symmetrical, which is generally preferable but not essential.

The radii of curvature of the two recesses 3, 4 correspond to that of the connecting device. The device comprises two components 5, 6 illustrated in detail in Figure 3. Component 5 is a mirror image of component 6 about their common plane of symmetry 7 so that, when joined together, components 5 and 6 form a hollow cylinder with an inner wall 8. Each of components 5, 6 is provided on at least one free end 9 thereof, preferably on both free ends 9, 10 with a projection 11a (component 5), 11b (component 6) and 12a, 12b respectively. The projection in the illustrated embodiment is in the form of a truncated cone but other shapes e.g. cylindrical may be used.

Projections 11a, 11b on free end 9 of the two cylinder halves serve the purpose of receiving a plate 13. Plate 13 is disc-shaped and provided with an annular flange 14. The inner surface 15 of annular flange 14 corresponds in shape to that of the two adjoining projections 11a, 11b, also with respect to the cone angle of the projections, to ensure a precise fit thus enclosing and securely holding the projections together. Plate 13 thus lies in a plane perpendicular to the contacting plane 7 of components 5, 6.

A socket 16 having an internal thread 17 is disposed in the centre of plate 13. The socket 16 and internal thread 17 are provided to connect plate 13 to an opposite plate 18 which, in analogous manner, encloses the two projections 12a, 12b on the opposite free ends 10 of components 5, 6. Plate 18 includes a bore 19 instead of the socket 16 but is otherwise identical to plate 13 and accordingly includes annular flange 14. The two plates 13, 18 can be interconnected by means of a screw 20; screw 20 is thus, together with socket 16, located in the interior of the hollow cylinder formed by components 5, 6.

The two components 5, 6 are thus rigidly interconnected. The conical mating surfaces of projections 11a, 11b and 12a, 12b respectively, and of annular flange 14 ensure a tight-fitting centring of the two components 5, 6 relative to one another. Screw 20 can easily be loosened at any time, thereby enabling plates 13, 18 to be removed so that components 5, 6, and consequently members 1, 2, can be separated. A screwdriver is all that is required for this purpose.

Each component 5, 6 is attached to its associated member 1, 2 by fastening means, preferably by screws 21, 22, which are successively fastened. As seen in Figure 3, each screw 21, is illustrated in side view, while each screw 22, is illustrated in front and rear end view. The screws 21, 22 are inserted through bores 23 in the inner wall 8 of each of components 5, 6 and screwed into an appropriate bore in members 1 and 2 respectively. Two screws 21, 22 and two

bores are preferably provided for each of components 5, 6, as illustrated, and these are positioned at right angles to one another and form an angle of 45° with contacting plane 7. This ensures that any tearing apart of components 5 and 6 and its associated member 1, 2 is practically precluded even when high tensile stresses are applied perpendicular to the contacting plane 7.

A further advantage of this arrangement is that four members can be interconnected if so desired. Figure 2 shows a dotted line 24—24 which represents a further possible contacting plane between two adjacent members. In this instance, the two members are appropriately aligned and connected to the first component, for example component 5, using only one screw 21 or 22 for fastening the member to the respective component. The two other members are connected to the other component in analogous manner, and then the two components are assembled as described above whereby all four members are interconnected.

It is further evident from the above that the present device, with suitable design of the components 5, 6 and of the members, is not only suitable for interconnecting two members but also, for example, three or four members. The number of components need not necessarily correspond to the number of members as is the case in the above-mentioned embodiment of four members.

Components 5, 6 and plates 13, 18 are respectively cylindrical and circular in shape in the embodiment illustrated, which is preferably from a manufacturing point of view. However, this is not necessary; a prismatic, for example, overall hexagonal configuration of the two components 5, 6 could equally well be used. Plates 13, 18 and recesses 3, 4 in members 1, 2 would then have to be shaped correspondingly. It is also not essential that component 5 be a mirror image of component 6 although, from a manufacturing point of view, this is of course the best solution.

Theoretically plate 13 would be sufficient by itself provided it is ensured that plate 13 is held in a position firmly enclosing projections 11a, 11b (in this instance, the mating surfaces would not be conical in shape and, if deemed necessary, a locking means would have to be provided on the projections with the plate designed such as to slide over such locking means in the manner of a snap closure). However, two interconnected plates are preferable for safety considerations, particularly in order to protect against impact or vibrations.

CLAIMS

1. A device for detachably connecting at least

two members, comprising:

(a) at least two components each having top and bottom faces and a peripheral outside edge connectible in abutting relation with a respective one of the members; the components having a projection on at least one of the top and bottom faces thereof;

(b) cap means adapted to overlie and receive the projections thereby to interconnect the components; and

(c) means to secure the cap means on the components.

2. A device according to claim 1 wherein the components are symmetrical.

3. A device according to claim 2 and including a pair of identical components.

4. A device according to claim 3 wherein the pair of components form a generally cylindrical or prismatic shape.

5. A device according to any one of claims 1 to 4 and including a pair of cap means overlying projections on each of the top and bottom faces of the components.

6. A device according to claim 5 and including means interconnecting the cap means so as to secure the cap means on the components.

7. A device according to any one of the preceding claims wherein a pair of the components together form a hollow cylinder and each is provided with a truncated cone projection on each of its top and bottom faces, and wherein the cap means are associated with each face, each cap means including an annular flange whose inner surface corresponds in shape to the respective cone projection, and the cap means are interconnected by means of a screw passing through the hollow cylinder.

8. A device according to any one of the preceding claims and including at least one bore in each of the components for receiving a fastening means to secure the component to an associated member.

9. A device according to any one of the preceding claims and including at least two bores in each of the components for receiving fastening means at right angles to each other to secure the component in an associated member, each bore lying at an angle of substantially 45° to the contacting plane between the two members.

10. A device for detachably securing at least two members substantially as hereinbefore described with reference to the accompanying drawings.

11. An article of furniture including at least two members secured together by means of a device according to any one of the preceding claims.

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